National Institute of Environmental Health Sciences

Ecological risk assessment in the context of global climate change

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Abstract:

Changes to sources, stressors, habitats, and geographic ranges; toxicological effects; end points; and uncertainty estimation require significant changes in the implementation of ecological risk assessment (ERA). Because of the lack of analog systems and circumstances in historically studied sites, there is a likelihood of type III error. As a first step, the authors propose a decision key to aid managers and risk assessors in determining when and to what extent climate change should be incorporated. Next, when global climate change is an important factor, the authors recommend seven critical changes to ERA. First, develop conceptual cause-effect diagrams that consider relevant management decisions as well as appropriate spatial and temporal scales to include both direct and indirect effects of climate change and the stressor of management interest. Second, develop assessment end points that are expressed as ecosystem services. Third, evaluate multiple stressors and nonlinear responses-include the chemicals and the stressors related to climate change. Fourth, estimate how climate change will affect or modify management options as the impacts become manifest. Fifth, consider the direction and rate of change relative to management objectives, recognizing that both positive and negative outcomes can occur. Sixth, determine the major drivers of uncertainty, estimating and bounding stochastic uncertainty spatially, temporally, and progressively. Seventh, plan for adaptive management to account for changing environmental conditions and consequent changes to ecosystem services. Good communication is essential for making risk-related information understandable and useful for managers and stakeholders to implement a successful risk-assessment and decision-making process.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3601429

Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker, Public, Researcher

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event, Food/Water Quality, Other Exposure

Extreme Weather Event: Drought

Food/Water Quality: Chemical, Other Water Quality Issue

Water Quality (other): Water Temperature

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

General Health Impact

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified